AMENDMENTS TO THE CLAIMS

1. (currently amended)   An encoding method for an optical recorder, the optical recorder ~~comprising~~ including an encoder for encoding data received from a computer for storage on an optical disc, ~~and~~ a processor for controlling operations of the encoder, a buffer for storing data transmitted from the computer; wherein the encoder includes a host interface for receiving data from the computer; an encoder sector processor for encoding data according to modes of the data; an encoder buffer arbiter connected to the host interface, the buffer and the encoder sector processor for storing data from the host interface into the buffer, transferring data in the buffer to the encoder sector processor, and storing data encoded by the encoder sector processor into the buffer; a subcode generator connected to the encoder buffer arbiter for generating sub-channel data; a cross interleave reed-solomon code (CIRC) connected to the encoder buffer arbiter for generating main channel data; a modulator connected to the subcode generator and the CIRC for converting the sub-channel data and the main channel data so as to generate a serial data stream; a write controller connected to the modulator for converting the serial data stream into switch commands of write strategy; and an absolute time in pre-groove decoder (ATIP decoder) connected to the write controller for providing absolute time information; and the encoding method ~~comprising~~ comprises:

receiving data of a next mode which is different from a current mode from the computer even when the encoder is still encoding data of the current~~mode~~ mode;

storing data received by the encoder from the computer into the buffer

using the host interface to receive data from the computer;

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using the encoder buffer arbiter to store data from the host interface into the buffer;

using the encoder buffer arbiter to transfer data in the buffer to the encoder sector processor;

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using the encoder sector processor to encode data transmitted from the encoder buffer arbiter according to modes of the data;

using the encoder buffer arbiter to overwrite data stored in the buffer with data

10   encoded by the encoder sector processor;

using the subcode generator to generate sub-channel data;

using the CIRC to interleave data encoded by the encoder sector processor and

15   stored in the buffer so as to generate main channel data;

using the modulator to convert the sub-channel data and the main channel data so as to generate a serial data stream;

20   using the ATIP decoder to provide absolute time information; and

using the write controller to convert the serial data stream into switch commands of write strategy and outputting the switching commands with reference to the absolute time information.

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2. (cancelled)

3. (original)   The encoding method of claim 1 wherein the data is transmitted to the

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encoder through an IDE bus.

4. (cancelled)

5   5. (currently amended)   The encoding method of ~~claim 4~~ claim 1 wherein the encoder
buffer arbiter ~~comprises~~ includes a trigger register for generating initial triggers and
change mode triggers, the encoding method further comprising:

using the trigger register to output a change mode trigger to latch last data stored in
10   the buffer so as to notify the encoder sector processor and the subcode generator that
the last data and data following the last data need to be encoded with the next mode.

6. (currently amended)   The encoding method of claim 5 wherein the encoder buffer
arbiter further ~~comprises~~ includes a buffer arbiter for accessing data stored in the
15   buffer, and a data mode field register for storing a mode type of the next mode, the
encoding method further comprising:

using the buffer arbiter to access data stored in the buffer; and

20   updating the data mode field register when receiving the change mode trigger from
the trigger register.

7. (original)   The encoding method of claim 6 wherein the buffer arbiter is a DRAM
arbiter.

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8. (currently amended)   The encoding method of claim 5 wherein the encoder sector
processor ~~comprises~~ includes a sector processor for encoding data transmitted from
the encoder buffer arbiter, a first level encoder register for storing a data format of

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the current mode, and a second level encoder register for storing a data format of the next mode, the encoding method further comprising:

notifying the encoder sector processor that the last data and data following the last

5   data need to be encoded with the next mode when receiving the latched data from the encoder buffer arbiter; and

loading the data format of the next mode from the second level encoder register into the first level encoder register.

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9. (currently amended) The encoding method of ~~claim 4~~ claim 1 wherein the buffer ~~comprises~~ includes a sector data area for storing data transmitted from the host interface and data encoded by the encoder sector processor, and a Q channel program page area for storing program codes for the subcode generator, the

15   encoding method further comprising:

storing program codes of the current mode in a first storage space in the Q channel program page area; and

20   storing program codes of the next mode in a second storage space in the Q channel program page area.

10. (currently amended) The encoding method of claim 9 wherein the subcode generator ~~comprises~~ includes a subcode source register for selecting a source of the

25   sub-channel data, a sub-channel auto generator for generating sub-channel data, and a multiplexer for outputting sub-channel data, the encoding method further comprising:

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using the subcode source register to select a source for receiving program codes from the Q channel program page area or receiving sub-channel data from the sector data area;

5   using the sub-channel auto generator to generate the sub-channel data according to the program codes if the Q-channel program page area is selected; and

using a multiplexer to output the sub-channel data received from the sub-channel auto generator if the Q-channel program page area is selected or the sub-channel

10   data received from the sector data area if the sector data area is selected.

11. (currently amended) The encoding method of ~~claim 4~~ claim 1 wherein the buffer is a dynamic random access memory (DRAM), and the encoder buffer arbiter is an encoder RAM arbiter.

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12. (new) An encoder coupled to a buffer within an optical storage device for encoding received data for storage on an optical disc, the encoder comprising:

a host interface for receiving data having a plurality of modes from a computer;

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an encoder sector processor for encoding data according to the plurality of modes;

an encoder buffer arbiter being coupled to the host interface, the buffer, and the encoder sector processor for storing the data received from the host interface into the

25   buffer, transferring the data in the buffer to the encoder sector processor, and storing the encoded data outputted by the encoder sector processor into the buffer; and

a trigger register being coupled to the encoder sector processor for generating change

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mode triggers to indicate that last data stored in the buffer and data following the last data need to be encoded with a next mode.

13. (new) The encoder of claim 12, further comprising a data mode field register being coupled to the encoder sector processor for indicating the next mode to the encoder sector processor;

wherein when a change mode trigger is generated by the trigger register, the data mode field register is updated with a mode type of the next mode.

14. (new) The encoder of claim 12, wherein the encoder sector processor comprises

a sector processor for encoding data received from the encoder buffer arbiter;

a first level encoder register for storing a data format of the current mode; and

a second level encoder register for storing a data format of the next mode;

wherein the first level encoder register is for loading the data format of the next mode from the second level encoder register when notified that the last data and the data following the last data need to be encoded with the next mode.

15. (new) The encoder of claim 12, further comprising:

a subcode generator coupled to the encoder buffer arbiter for generating sub-channel data;

a cross interleave reed-solomon code (CIRC) coupled to the encoder buffer arbiter

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for interleaving the encoded data outputted by the encoder sector processor and stored in the buffer so as to generate main channel data;

5   a modulator coupled to the subcode generator and the CIRC for converting the sub-channel data and the main channel data so as to generate aserial data stream;

an absolute time in pre-groove decoder (ATIP decoder) for providing absolute time information; and

10   a write controller coupled to the modulator and the ATIP decoder for converting the serial data stream into switch commands of write strategy and outputting the switching commands with reference to the absolute time information.

16. (new) The encoder of claim 15, wherein the buffer comprises

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a sector data area for storing the data received from the host interface and the encoded data outputted by the encoder sector processor, and

a Q channel program page for the subcode generator having a first storage space area
20   for storing program codes of a current mode and a second storage space area for storing program codes of the next mode.

17. (new) The encoder of claim 15, wherein the subcode generator comprises

25   a subcode source register for selecting a source of the sub-channel data being receiving program codes from the Q channel program page area or receiving sub-channel data from the sector data area;

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a sub-channel auto generator for generating sub-channel data according to the program codes if the Q-channel program page area is selected as the source, and

5   a multiplexer for outputting sub-channel data received from the sub-channel auto generator if the Q-channel program page area is selected as the source or the sub-channel data received from the sector data area if the sector data area is selected as the source.

18. (new) The encoder of claim 12, wherein the buffer is a dynamic random access
10   memory (DRAM) and the encoder buffer arbiter includes a DRAM arbiter for accessing data stored in the DRAM.

19. (new) The encoder of claim 12, wherein the encoder is further for simultaneously receiving data of the next mode from the computer while still encoding data of a
15   current mode, the next mode being different from the current mode.

20. (new) The encoder of claim 12, wherein the data is transmitted from the computer to the encoder through an Integrated Drive Electronics (IDE) bus.

20   21. (new) An encoding method for encoding data received from a computer for storage on an optical disc, the method comprising:

receiving data of a next mode which is different from a current mode from the computer even when data is still encoding in the current mode;
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buffering the data received from the computer;

transferring the buffered data to a processor utilizing an encoder buffer arbiter;

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encoding the data transmitted from the encoder buffer arbiter according to modes of the data utilizing the processor;

5   overwriting the buffered data with data encoded by the processor utilizing the encoder buffer arbiter;

generating sub-channel data;

10   interleaving the data encoded by the processor and buffered so as to generate main channel data utilizing a cross interleave reed-solomon code (CIRC);

converting the sub-channel data and the main channel data so as to generate a serial data stream;

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providing absolute time information; and

converting the serial data stream into switch commands of write strategy and outputting the switching commands with reference to the absolute time information.

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22. (new) The encoding method of claim 21 further comprising outputting a change mode trigger to latch last data buffered so as to notify the processor that the last data and data following the last data need to be encoded with the next mode.

25   23. (new) The encoding method of claim 22 further comprising:

accessing the buffered utilizing a buffer arbiter; and

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updating the data mode field register when receiving the change mode tigger.

24. (new) The encoding method of claim 23 wherein the buffer arbiter is a DRAM arbiter.

5   25. (new) The encoding method of claim 22 further comprising:

notifying the processor that the last data and data following the last data need to be encoded with the next mode when receiving the latched data from the encoder buffer arbiter; and

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loading a data format of the next mode from a second level encoder register into a first level encoder register.

26. (new) The encoding method of claim 21 further comprising:

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storing program codes of the current mode in a first storage space in the Q channel program page area; and

storing program codes of the next mode in a second storage space in the Q channel

20   program page area.

27. (new) The encoding method of claim 26 the encoding method further comprising:

selecting a source for receiving program codes from the Q channel program page

25   area or receiving sub-channel data from the sector data area;

generating the sub-channel data according to the program codes if the Q-channel program page area is selected; and

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outputting the sub-channel data if the Q-channel program page area is selected or the sub-channel data received from the sector data area if the sector data area is selected.

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